Fundamental Analysis Conditioned on the Direction of Sales Change

ABSTRACT

We add to previous research on fundamental analysis by investigating why and how specific signals provide value-relevant information under different conditions. Our analysis provides empirical support for predictions about the value-relevance of various signals based on either providing information about future sales growth or about the efficiency of the business in using or consuming resources to generate sales. We demonstrate how specific signals are differentially informative in sales-increase versus sales-decrease periods.

Keywords: fundamental analysis, financial statement analysis, firm performance, stock returns, sales change

I. INTRODUCTION

Fundamental analysis is a technique applied to determine the value of corporate securities by examining key value-drivers such as earnings, growth, and competitive position. It uses information found in financial statements to gain insights about a company's future performance. Previous studies have analytically and empirically investigated the value relevance of broad sets of fundamental signals (Brown, 1993; Ou and Penman, 1989; Lipe, 1986; Ou, 1990; Lev and Thiagarajan, 1993; Nissim and Penman, 2001; Abaranell and Bushee, 1997, 1998; Greig, 1993; Dechow et al., 2001), but have not provided in-depth conceptual and empirical analysis of individual signals with an objective of learning why and how specific signals convey incremental information about future earnings and firm value. Because many fundamental signals are based on changes in sales, a relevant question is whether the signals are differentially informative when sales increase and when sales decrease. We describe and test predictions about specific fundamental signals using an empirical specification that discriminates between sales-increase and sales-decrease observations. We draw inferences from the results of this estimation for evaluating the information provided by various signals.

Fundamental signals are value-relevant if they convey information to investors that alters their expectations about future cash flows. Changes in earnings themselves are value-relevant and other signals are incrementally value-relevant to earnings changes if they provide additional information that is useful for predicting future operating earnings in relation to invested capital. Many fundamental signals relate changes in resources used or consumed to changes in sales. These signals may be informative in two ways – they may provide information about expected demand for the company's products that causes investors to update their expectations of future sales growth

or they may provide information about resource utilization that causes investors to update their prior beliefs about resource usage or consumption in relation to sales.

We incorporate the direction of sales change into fundamental analysis because incentives for managing resources, information conveyed by management actions and performance outcomes differ with circumstances that are indicated by the direction of sales change in the current period. For instance, a sales increase suggests new opportunities and optimism while a sales decrease suggests potential problems or difficulties in selling products. When sales increase, an increase in accounts receivable relative to sales may indicate good news because it suggests that managers are confident and are wisely strengthening customer relationships by offering competitive payment terms, When sales decrease, lower cuts in accounts receivable relative to sales may indicate bad news if this relation reflects management efforts to bolster sales by relaxing credit terms unwisely.

When sales increase, investors look for evidence indicating whether the increase is persistent and if the growth is likely to continue, and, when sales decrease, they look for information to help them assess whether the decrease is temporary and what the likely duration of a downturn is. When sales increase, a greater proportionate increase in SG&A expenses relative to current sales may indicate investment aimed at generating future benefits or it may reveal that marginal growth is costly. When sales decrease, failure to reduce SG&A spending proportionately may indicate ineffective resource management while, on the other hand, continuing to spend on SG&A may reflect optimism about a turnaround (Anderson et al, 2007). Thus, the information conveyed to investors by signals may be different when evaluating firms experiencing sales increases versus decreases. We investigate whether and how the direction of sales change affects the information provided by the signals used in fundamental analysis.

For a sample of 60,693 firm-year observations from 1985 to 2015, we describe and test predictions about specific fundamental signals, which, in addition to change in earnings per share (EPS), include signals based on capital expenditures, accounts receivable, inventory, property, plant and equipment (PP&E). sales per employee, gross margin, selling, general and administrative (SG&A) costs, and audit opinion. Our analysis and results are useful for sorting out the types of information conveyed by individual signals. The relations we find between stock returns and signals based on capital expenditures relative to industry, accounts receivable turnover, and sales per employee are in line with these signals providing information about future sales growth. The relations between stock returns and signals based on PP&E turnover, gross margin and SG&A to sales are in line with these signals providing information about the efficiency of the business in using and consuming resources in relation to sales. We also document that signals based on changes in EPS, capital expenditures, accounts receivable, sales per employee, PP&E turnover, gross margin, and audit opinion are differentially informative about expected future firm performance for sales-increasing firm-year observations versus sales-decreasing observations.

In the next section, we review the literature on fundamental analysis as it pertains to our study. In Section III, we use a valuation framework to make predictions about the incremental information provided by specific signals and develop our hypothesis that signals may provide differential information when sales increase versus when sales decrease. In Section IV, we describe the methodology and sample data. In Section V, we present the empirical results. In Section VI, we conclude by summarizing our findings and discussing implications.

II. LITERATURE REVIEW

Fundamental analysis involves a careful examination of a firm's activities and prospects based on publicly available financial reports as well as other sources of information concerning the firm, the markets in which it competes, and the overall economic environment (Bauman, 1996). A primary objective of fundamental analysis is to gain insights about a company's future performance through information provided in financial statements. Findings by Lev and Thiagarajan (1993) and Abarbanell and Bushee (1997, 1998) indicate that fundamental signals are value-relevant, and that analysts must search for information from these signals in order to assess the value of a firm.

Investors can use information in financial statements to forecast earnings for the reporting entity, estimate the risk of these earnings, and ultimately make an assessment of the intrinsic value of the firm that can be compared to observed market prices (Richardon, Tuna, and Wysocki, 2010). Piotroski (2000) demonstrates that a simple accounting-based fundamental analysis strategy, when applied to a broad portfolio of high book-to-market firms, can shift the distribution of returns earned by an investor. Mohanram (2005) shows that a fundamental analysis-based approach, appropriately tailored for low book-to-market firms, is successful in differentiating between winners and losers in terms of ex-post stock returns. Similarly, Mohanram, Saiy, and Vyas (2017) provide evidence supporting the usefulness of such an approach to provide insights for analyzing U.S. banks.

Analysts generally attach a specific interpretation to a fundamental signal (e.g., a disproportionate increase in inventory conveys bad news). However, Lev and Thiagarajan (1993) point out that a signal used in fundamental analysis may have different implications for future earnings under different circumstances and highlight the importance of performing conditional

fundamental analysis. Deakin (1977) comments that interpretation of the results of using financial data in predicting corporate failure must be considered in light of the nature of the process a company follows leading to the failed state. Poston, Harmon, and Gramlich (1994) point out that, although prior studies have proved the usefulness of accounting-based variables to predict corporate performance, they ignore the fact that these variables may have different predictive power for a financially healthy firm and a firm that is facing difficulties at a point in time. Beneish et al. (2001) examine the usefulness of contextual fundamental analysis for the prediction of extreme stock returns. They show that accounting-based fundamental variables are more useful in separating losers from winners among the subset of predicted extreme performers, and predicted extreme winners earn substantially higher returns than predicted extreme losers. Mohanram (2005) suggests that the fundamental analysis-based trading strategy identified by Piotroski (2000) is less successful in low book-to-market firms than for high book-to-market firms. These studies illustrate the usefulness of conditioning fundamental analysis on context.

In this regard, there is an increasing volume of literature that examines differences in cost behavior (how costs change in relation to changes in sales) between sales-up and sales-down periods. This asymmetry in cost behavior results from managers' decisions to retain or release resources when demand falls (Anderson, Banker, and Janakiraman, 2003). Banker and Chen (2006) demonstrate that an earnings prediction model that discriminates between sales-up and sales-down periods outperforms other models. Anderson et al. (2007) base their analysis of the SG&A cost signal on sticky cost behavior – that managers deliberately retain resources that are not required to support a reduced level of sales activity if they are optimistic about future sales. They find that future earnings are negatively related to the change in the SG&A cost to sales ratio in sales-increasing periods, but positively related to the change in the SG&A cost ratio in sales-

decreasing periods. Thus, the interpretation of the SG&A signal in fundamental analysis may be conditioned on the direction of the change in sales (up or down).

Abarbanell and Bushee (1997) suggest that the direction of firm-specific earnings news may affect the interpretation of some signals. They find that the accounts receivable signal provides positive information for future earnings in good news (an increase in earnings relative to the prior year) years, as opposed to the predicted direction, and the gross margin and SG&A signals are informative only in the bad news (an earnings decline from the prior year) years. Compared with the direction of change in earnings as a condition used by Abarbanell and Bushee (1997), the direction of change in sales is a more primitive indicator of varying conditions under which managers make decisions in response to changes in demand and sales volume.

III. FUNDAMENTAL SIGNALS

We follow the literature on fundamental analysis (Lev and Thiagarajan, 1993; Abarbanell and Bushee, 1997, 1998) to identify nine fundamental signals: signals based on earnings per share, capital expenditures, accounts receivable, inventory, property, plant and equipment, sales per employee, gross margin, SG&A expenses, and audit opinion.[1] Because previous research was interested in the broader question whether fundamental analysis provided value-relevant information, limited attention was given to the questions why and how specific fundamental signals were value-relevant. Predictions about the signs on individual signals were based on commonly accepted interpretations ascribed to financial analysts. We take a step back and consider why specific fundamental signals may provide value-relevant information.

[1] We don't use earnings quality based on LIFO because it is no longer relevant. We exclude effective tax rate because it constrains our sample.

A financial signal conveys value-relevant information when it alters investor expectations about the amout, timing and uncertainty of current and future cash flows. A change in earnings is value-relevant because it provides information about current cash flows and causes investors to update their expectations about future cash flows. Other financial signals are incrementally informative to a change in earnings if they cause investors to modify their expectations about future cash flows conditional on current earnings.

In a discounted cash flow valuation model that uses operating earnings to proxy for operating cash flows (see, for instance, Penman, 2013), entity value is the present value of future free cash flows based on assumptions about four parameters over time: sales growth, net operating asset turnover (NOAT), net operating profit margin (NOPM), and the discount rate. This valuation framework is useful for describing how fundamental signals provide value-relevant information. NOAT relates sales to net operating assets and measures the investment in various resources used to support sales. NOPM relates sales to operating costs and measures the reources consumed to generate sales. Three of the nine signals identified above are directly related to NOAT because they represent resources that are key components of net operating assets: the receivables signal measures the change in receivables relative to the change in sales, the inventory signal measures the change in inventory relative to the change in sales, and the PP&E signal measures the change in PP&E relative to the change in sales. Two of the nine signals are directly related to NOPM because they represent resources that are consumed in the generation of sales: the gross margin signal relates the change in the cost of goods sold to the change in sales and the SG&A signal relate the change in selling, general and administrative costs to the change in sales. Another signal, the sales to employees signal, relates the change in human resources to the change in sales. Thus, six of the nine signals relate changes in resources used or consumed to changes in sales.

These signals may provide information that alters investors' expectations about the resources required to support or generate sales – NOAT or NOPM, or they may provide information that affects investors' expectations about future sales growth. The latter is less direct but important because changes in resource usage or consumption may reflect information about managers' expectations about future sales. For example, an increase in SG&A costs relative to sales may indicate ramping up in order to meet a higher level of future sales. We discuss these types of information with respect to each of the signals below. The fundamental signals described below are summarized in Appendix I.

Earnings per Share (∆EPS)

The earnings per share signal is defined as the change in EPS relative to the previous year, scaled by the beginning stock price. An increase in EPS is favorable as it indicates higher profitability in the current period and suggests higher profitability in future periods. Large literatures in accounting support the value-relevance of earnings changes and the impact of a change in earnings on the time series of earnings. As with previous research in fundamental analysis, we include the EPS signal as a base-line signal and investigate how other signals provide incremental information to the change in EPS. We note, however, that we discriminate between sales-increase and sales-decrease periods for the EPS signal just as for other signals. A change in EPS when sales increase may have different value implications than a change in EPS when sales decrease.

Capital Expenditure (CAPX)

The capital expenditure signal is defined as the difference between the annual percentage change in the firm's capital expenditures and the percentage change in the corresponding two-digit industry capital expenditures. An increase in the capital expenditure signal indicates more

investment in long-term assets to fund new projects relative to industry peers. This is favorable information for firm's future performance as it implies that the firm has the confidence and financial ability to invest in itself through capital expenditures. Under this traditional interpretation, the predicted sign on the coefficient is positive (the coefficient refers to the coefficient on the value of the signal in an empirical model that relates changes in firm value to the signals). An alternative is that the company is overinvesting in itself by unwisely investing at a rate greater than its industry peers. Under this alternative interpretation, the predicted sign on the coefficient is negative.

The observed coefficient reflects the balance between the two explanations. When sales are increasing, the weight on the traditional intepretation is likely to be stronger than it is when sales are decreasing. Conversely, when sales are decreasing, the weight on the alternative interpretation is likely to be stronger than it is when sales are increasing. Investing at a higher rate than peer firms when the company is losing sales is likely to be less favorable than investing at a higher rate when the company is gaining sales.

Accounts Receivable (AR)

The accounts receivable signal is defined as the difference between the annual percentage change in sales and the percentage change in receivables. Under the traditional interpretation (Lev and Thiagarajan 1993), receivables' growth that is faster than growth of sales indicates bad news. Under this interpretation, increases in accounts receivable relative to sales suggest that the company has difficulties in selling its products (generally triggering credit extensions), and there is an increasing likelihood of future earnings decreases from increases in receivables' provisions. In this case, the signal has a negative value and the predicted sign on the coefficient is positive.

In contrast, however, an increase in accounts receivable relative to sales may suggest that management expands credit to increase future sales and earnings, as argued and evidenced by Abarbanell and Bushee (1997). Under this alternative interpretation of the accounts receivable signal, increases in accounts receivable are considered as an investment in customer relations, and thus a favorable signal. Because the value of the signal is negative when receivables are increasing faster than sales (or falling slower than sales), the predicted sign on the coefficient under the alternative intepretation is negative.

Again, the observed coefficient reflects the relative strength of the two competing explanations. If the traditional interpretation is weighted more heavily than the alternative interpretation, the coefficient will be positive and the converse is true. The accounts receivable signal when sales decrease is particularly interesting because companies may use receivables to bolster sagging sales unwisely (traditional) or to retain and support valued customers in a downturn (alternative).

Sales per Employee (SPE)

The sales per employee signal is defined as the annual percentage change in sales-per-employee (the ratio of annual sales to the number of employees at year end). Under the traditional interpretation, a positive value of the signal (i.e., an increase in sales-per-employee relative to prior year) implies higher productivity and good news. Financial analysts generally comment favorably on announcements of corporate restructuring, particularly labor force reductions. In the year of a significant labor force reduction, wage-related expenses (e.g., severance pay) may increase but expected future labor costs decrease. Reported earnings, in such cases, do not reflect the future benefits from restructuring, and fundamentals such as the sales per employee signal are used to provide a better assessment of future earnings (Lev and Thiagarajan, 1993). Thus an increase in

the sales per employee ratio (the value of the signal is positive) is considered good news for future performance. Under the traditional interpretation, the predicted sign on the coefficient is positive.

On the other hand, employees may be added when managers anticipate that current and future demand would support an increase in labor capacity. Because there may be a lag between the addition of employees and the realization of higher sales, a decrease in sales per employee may indicate manager confidence in growing sales. If the market is looking for signs of growth and expansion, as well as managerial confidence, this might be particularly relevant when sales are increasing. Oi (1962) and Becker (1975) suggest that skilled labor is a partially fixed asset of the company. If specifically trained employees are not laid off when there is a decline in demand, the firm would gain in the future if the decline in demand is temporary. Therefore, there is an incentive not to lay off employees with specific training (Becker 1975; Horning, 1994), or skilled employees which is known as "labor hoarding" (Summers, 1986; Burnside, Eichenbaum, and Rebelo, 1993). Thus, a decrease in sales per employee (the value of the signal is negative), when sales are declining, may indicate managers' confidence in the future growth of the firm and their unwillingness to lay off employees as they are optimistic and anticipating future opportunities, and therefore would be considered as good news. Under this alternative interpretation, the predicted coefficient on the signal is negative.

As with the previous signals, the observed coefficient reflects the relative weights on the traditional and alternative explanations. Because the relative weights may shift when sales decline as opposed to when sales increase, the magnitude of the observed coefficients may differ in sales decrease versus sales increase periods. For instance, the market may value improving labor efficiency (traditiona) as relatively more important when sales decline.

Property, Plant and Equipment (PPE)

The property, plant and equipment signal is defined as the difference between the annual percentage change in sales and the percentage change in PP&E, or equivalently the change in sales per dollar invested in PP&E. A positive value of the signal (i.e., sales' growth is greater than that of PP&E) implies good news due to higher productivity and capacity utilization, and therefore a positive relation with expected firm performance. In this case, the predicted sign on the coefficient is positive.

Alternatively, growth in PP&E relative to sales may indicate that managers are expanding aggressively because they are confident about future demand. In this regard, PP&E differs from accounts receivable and employees because of the long lead time required to add new PP&E. This makes it important to analyze both the addition of PP&E as an outcome of long-term planning and the sales generated from PP&E as a realization of the anticipated demand. For this reason, we included the CAPX signal that measures capital expenditures relative to industry to pick up the growth dimension of investment in PP&E.

As with other signals, the traditional and alternative explanations may both be valid and the sign on the coefficient would reflect the balance or dominance of one explanation over the other. For retail companies, analysts look at same-store sales to distinguish between increases in sales due to expansion and increase in sales due to higher productivity or capacity utilization. When sales decline, the value of the PP&E signal is negative if the decline in sales is greater than the decline in PP&E. This bad news under the traditional interpretation may be tempered by the good news under the alternative interpretation that the loss in sales is not due to reduction in PP&E itself. Also, because of the fixed nature of PP&E (adjustment takes time) and the possibility that a

decline in sales is temporary, investors may put less weight on a loss in productitivy reflected in a negative value of the signal.

Inventory (INV)

The inventory signal is defined as the difference between the annual percentage change of sales and the percentage change in inventory. A positive value of the signal (i.e., sales' growth is larger than that of inventory) indicates good news and a positive relation with firm performance. An important quality of the inventory signal is that it represents differences between realized sales and anticipated sales because inventory levels depend on production planning. This leads to an important distinction between PP&E turnover and inventory turnover from an information perspective because PP&E levels depend on long-run planning while inventory levels depend on short-run planning. When sales increase faster than inventory levels, the implication is that demand is higher than expected (good news) and when inventory levels increase faster than sales, the implication is that demand is lower than expected (bad news). An inventory build-up suggests difficulties in generating sales, and earnings are expected to decline as management attempts to lower inventory levels. A build-up also suggests the existence of slow-moving or obsolete items that will be written off in the future. The value-relevance of an inventory build-up may be more acute when sales decline.

For inventory, the traditional interpretation is based on the information obtained from the signal about demand and future sales growth. This is different from receivables, employees and PP&E where the alternative interpretations reflected information obtained from the signal about future sales growth. However, the information comes from realized sales relative to inventory levels as opposed to changes in inventory levels to accommodate future sales. An alternative interpretation of the inventory signal would be that the company has become more efficient in

using inventory to generate sales. For instance, the company may have implemented a just-in-time inventory system or enhanced its production planning in other ways to reduce inventory levels. In this case, the predicted sign on the coefficient would also be positive so there is not the same type of distinction between the predicted signs for the traditional and alternative interpretations as there is for the other signals.

Gross Margin (GM)

The gross margin signal is defined as the difference between the percentage change in gross margin and that of sales. A positive value of the signal (i.e., an increase in the gross margin as a percentage of sales), implies good news, and therefore a positive relation with firm performance.

Gross margin is affected by both pricing and the cost of goods sold. Thus, it reflects a combination of the market demand for the firm's products and the efficiency of the firm's production processes. From a strategic perspective (Porter ??), differentiation of the firm's products, on dimensions such as quality and product features, enables the firm to charge higher pries while cost leadership (production excellence) enables the firm to produce at lower costs, relative to competitors. A higher gross margin is desirable as it suggests a greater potential for earning larger profits. Businesses with higher gross margin are better equipped against unanticipated increases in the cost of production or competition. A decrease in gross margin is viewed negatively as poor sales performance (declining demand) will typically lead to lower gross margins. From a valuation perspective, gross margin is directly related to NOPM. If the market believes that an increase in gross margin is sustainable, it will reward the company. Thus, under the traditional interpretation, the predicted sign on the coefficient for gorss margin is positive.

An alternative interpretation of changes in the gross margin percentage is that companies use pricing to gain or retain market share. This may be more relevant when sales decline – companies

may discount their products to retain their market position, but could also be relevant when sales are growing if a company is pricing aggressively to ward off competition. Under the alternative interpretation, a decline in gross margin may be valuable if it provides positive information about sales growth. Because the coefficient observed represents the balance between the traditional and alternative explanations, the coefficient when sales decline may be lower than the coefficient when sales increase due to the likelihood that companies are discounting their products when sales decline.

SG&A Expenses (SG&A)

The SG&A expenses signal is defined as the difference between the annual percentage change in sales and the percentage change of SG&A expenses. A positive value of the signal (i.e., sales' growth is larger than that of SG&A expenses) implies good news because the company is using its SG&A resources more effectively, and therefore a positive relation with firm performance. Conversely, a disproportionate (to sales) increase in SG&A expenses is considered a negative signal as the increase suggests inefficiency and inability of managers to control costs (Lev and Thiagarajan, 1993). Thus, under the traditional interpretation, a positive coefficient is predicted.

However, SG&A expenses have both an investment component that aims at discovering new products and technologies and a maintenance component that supports current operations (Enache and Srivastava, 2017). Therefore, disproportionate increases in SG&A expenses may indicate either increases in investment or decreases in efficiency, or both. So, the alternative interpretation of the SG&A signal is that an increase in SG&A costs in proportion to sales (SG&A costs growing faster than sales) may represent greater investment in the future and indicate managers' confidence in future sales growth. This may occur when sales increase or when sales decline. The predicted coefficient under the alternative interpretation is negative.

Audit Opinion (AO)

The audit opinion signal is given a value of 1 if the auditor's opinion is unqualified, and 0 for other opinions. The signal with a value of 1 implies good news, and therefore a positive relation with firm performance.

A qualified or adverse audit opinion obviously sends a negative massage to investors. Dopuch, Holthausen and Leftwich (1986) documented a significant negative stock price reaction to qualified audit opinions. The market may be more sensitive to information about accounting quality for sales-increasing firms because investors are expecting a clean audit opinion for such firms.

The table below summarizes the predicted coefficients under the traditional and alternative interpretations of the various signals.

Predicted Coefficients under Tradtional and Alternative Interpretations

		Sign of the signal	**Interpretation of the signal (expected coefficient)**	
Signal			**Traditional**	**Alternative**
CAPX	CAPX growing faster (falling slower) than industry	+	Good news (+)	Bad news (-)
	CAPX growing slower (falling faster) than industry	-	Bad news (+)	Good news (-)
Accounts Receivable	Sales growing faster (falling slower) than receivables	+	Good news (+)	Bad news (-)
	Sales growing slower (falling faster) than receivables	-	Bad news (+)	Good news (-)
Inventory	Sales growing faster (falling slower) than inventory	+	Good news (+)	Good news (+)
	Sales growing slower (falling faster) than inventory	-	Bad news (+)	Bad news (-)
PP&E	Sales growing faster (falling slower) than PP&E	+	Good news (+)	Bad news (-)
	Sales growing slower (falling faster) than PP&E	-	Bad news (+)	Good news (-)

Sales per Employee	Sales growing faster (falling slower) than employees	+	Good news (+)	Bad news (-)
	Sales growing slower (falling faster) than employees	-	Bad news (+)	Good news (-)
Gross Margin	Gross margin growing faster (falling slower) than sales	+	Good news (+)	Bad news (-)
	Gross margin growing slower (falling faster) than sales	-	Bad news (+)	Good news (-)
SG&A	SG&A expenses growing faster (falling slower) than sales	+	Good news (+)	Bad news (-)
	SG&A expenses growing slower (falling faster) than sales	-	Bad news (+)	Good news (-)
Audit Opinion	Unqualified		Good news (+)	
	Qualified and other		Bad news (+)	

Previous research has shown the importance of conditioning fundamental analysis on factors such as earnings change (Abarbanell and Bushee, 1997) and book-to-market ratio (Piotroski, 2000; Mohanram, 2005). We investigate how the direction of sales change in the current period affects the information provided by the signals (Anderson et al., 2007). Banker and Chen (2006) demonstrate that an earnings prediction model that incorporates the direction of the sales change is better in capturing the earnings generating process than other models. In addition, management practices differ between upturns and downturns of businesses and such differences have a strong influence on firm performance (Bromiley, Navarro and Sottile, 2008; Navarro, Bromiley and Sottile, 2010). As indicated in our discussion of various signals, the relative weights on the traditional and alternative interpretations may differ in sales-increasing versus sales-decreasing periods.

HYPOTHESIS 1 (H1): Fundamental signals are differentially informative between firms experiencing an increase in sales relative to the prior period and those experiencing a decrease in sales.

IV. SAMPLE DATA AND METHODOLOGY

Sample Data

We obtain the accounting data from COMPUSTAT annual files for North American firms and stock return data from the Centre for Research in Securities Prices (CRSP) monthly files.. We winsorize the data based on the top and bottom 1% for each variable in our analysis. We exclude from the sample financial services firms (SIC 6000-6999) because of differences in interpreting financial reports between these industries and other industries (Subramanyam, 1996). Firms with sales revenue, absolute book value of equity, or market value of equity less than $1 million are excluded from the sample. Our final sample contains 60,693 firm-year observations covering the years from 1986 to 2015[2].

Methodology

Following Lev and Thiagarajan (1993), we relate the one-year and two-year size-adjusted buy-and-hold returns (*RET1 or RET2*) to fundamentals that are based on current earnings change (ΔEPS), capital expenditure (*CAPX*), accounts receivable (*AR*), sales per employee (*SPE*), property, plant and equipment (*PP&E*), inventory (*INV*), gross margin (*GM*), SG&A expenses (*SG&A*), and audit opinion (*AO*).

$RET1_{i,t}$ is defined as the 12-month buy-and-hold returns of firm *i* in year *t* with the period starting from the beginning of the fourth month of year *t* through the third month of year *t* + 1 (Lev

[2] The sample period includes 2015 because our measure of returns requires two-year ahead data.

and Thiagarajan 1993). Starting the cumulation period at the beginning of the fourth month accommodates the release of quarterly financial information and annual financial statements during the return period. $RET2_{i,t}$ is defined as the 24-month buy-and-hold returns of firm *i* in year *t* with the period starting from the beginning of the fourth month of year *t* through the third month of year *t* + 2. Both *RET1* and *RET2* are size-adjusted by subtracting the mean returns in the same period for the same capitalization decile as the firm on CRSP (Mohanram 2005). If the firm is delisted, the delisting return is used if available. Definitions of the fundamental signals are presented in Appendix I.

To investigate whether fundamental signals are differentially informative between firms experiencing an increase or decrease in sales, we first estimate a baseline regression for the full sample. We estimate the model in equation (1).

$$RET_{i,t} = \alpha + \sum_{j=1}^{9} \beta_{j,i,t} Signals_{j,i,t} + \varepsilon_{i,t} \quad (1)$$

where

RET is *RET1* or *RET2* and *Signals* are the nine fundaemtnal signals of interest. We then estimate equation (1) separately for firms experiencing an increase and firms experiencing a decrease in sales in the current period relative to the previous period.

Next, to test whether signals are differentially informative in sales-up and sales-down periods, we estimate model (2) below with a dummy variable indicating the direction of the change in sales.[3]

$$RET_{i,t} = \alpha + Decrease\_Dummy + \sum_{j=1}^{9} \beta_{i,j,t} Signals_{j,i,t} + Decrease\_Dummy \times$$

$$\sum_{j=10}^{18} \beta_{j,i,t} Signals_{j,i,t} + \varepsilon_{i,t} \quad (2)$$

where

[3] Estimating model (2) is redundant to estimating the seprate regressions but facilitiates the analysis.

Decrease_Dummy is an indicator variable that equals one if there is a decrease in sales in the current period relative to the prior period, and zero if there is an increase.

We first adopt a year-by-year OLS regression approach using Fama-MacBeth (1973) two-step procedure for model (1). We then use the panel regression approach with firm fixed effects for estimating models (1) and (2), controlling for year fixed effects.

Variance inflation factors (VIF's) are calculated for each independent variable (see Neter et al. 1985, pp. 390-393). All of the VIF's were less than 3 (indicating no serious multicollinearity).

Descriptive Statistics

Table 1 provides descriptive statistics. Descriptive statistics for the full sample are presented in panel A of Table 1. Descriptive statistics for the sales-increasing subsample are presented in panel B and for the sales-decreasing subsample are presented in panel C of Table 1. Panel D compares the mean of variables and signals between sales-increasing and sales-decreasing subsamples.

[Insert Table 1 Here]

There are more firms that experienced an increase in sales than a decrease. Firms that had an increase in sales had much higher earnings per share (EPS), more sales and inventory, higher gross margin and SG&A expenses, more employees, lower PP&E and assets, and higher one-year and two-year returns than firms that had a decrease, on average.

A comparison of the signals between the two conditions (see Panel D of Table 1) is useful for setting the background for our analysis. The EPS signals that measures the EPS growth rate has a higher mean value of 0.027 for sales-increasing than that of 0.003 for sales-decreasing firms. The capital expenditures signal that measures whether new CAPX is higher for the firm than for its industry peers has a mean value of 0.397 for sales-increasing firms, which is significantly larger

than that of sales-decreasing firms (0.038). The accounts receivable signal that measures whether receivables are growing faster than sales, has a mean value of -0.017 for sales-increasing firms, which is higher than that of sales-decreasing firms (-0.073). The sales per employee signal that measures whether the sales per employee are increasing relative to prior year has a mean value 0.121 for sales-increasing firms, and it is larger than that for sales-decreasing firms (-0.040). The PP&E signal that measures whether sales are growing faster than PP&E has a mean value of 0.097 for sales-increasing firms, which is significantly greater than that of sales-decreasing firms (-0.052). The inventory signal that measures whether sales are growing faster than inventory has a mean value of 0.021 for sales-increasing firms, which is higher than that for sales-decreasing firms (-0.081). The gross margin signal that measures whether sales are growing faster than cost of goods sold has a mean value of 0.004 for sales-increasing firms, which is larger than that for sales-decreasing firms (-0.024). The SG&A signal that measures whether sales are growing faster than SG&A costs has a mean value of 0.058 for sales-increasing firms, and it is higher than that for sales-decreasing firms (-0.095). The audit opinion signal that indicates whether the firm has an unqualified audit opinion or not is also significantly higher for sales-increasing firms than sales-decreasing firms (0.739 versus 0.698).[4]

Panel E provides the proportion of firm-year observations that has an increase in sales versus a decrease. Observations that have a sales increase account for 72.75 percent of the sample, and sales decrease observations account for 27.25 percent.

[4] Auditor's opinion on a company's financial statements includes unaudited, unqualified, qualified, no opinion, unqualified with additional language, and adverse opinion in the Compustat data. Unqualified opinion accounts for about 70% of all opinions of the sample. Thus about 30% of audit opinions are made up of the remaining five opinions including qualified opinion.

Table 2 provides correlations among all the variables and signals used in the empirical analysis. All the signals are significantly and positively correlated with one-year and two-year returns except for the accounts receivable signal, which is negatively correlated with the returns.

[Insert Table 2 Here]

V. EMPIRICAL RESULTS

Tables 3 provides results of year-by-year estimation of model (1) for the full sample. Most of the yearly coefficients of the EPS, CAPX, PP&E, inventory, gross margin, S&A expenses, and audit opinion signals are positive, and most of the yearly coefficients of the accounts receivable and sales per exmployee signals are negative. For most years, these coefficients are also statistically significant. The across-years significance test based on Fama-MacBeth (1973) two-step procedure indicates that all the signals are statistically significant at the 1 percent level.

[Insert Table 3 Here]

Tables 4 provides panel regression results of model (1) for the full sample and for the two subsamples based on the direction of sales change of the current period *t*.

[Insert Table 4 Here]

We observe that, for the full sample reported in column (1), the EPS, CAPX, PP&E, inventory, gross margin, SG&A expenses, and audit opinion signals are all significantly and positively related to one-year returns. These results are consistent with the Fama-MacBeth results and support the traditional interpretations of these signals: CAPX that is higher for the firm than for its industry peers, sales growth that is larger than the growth of PP&E, sales growing faster than inventory, sales growing faster than SG&A expenses, and gross margin growing faster than sales, are

favorable indicators for the firm's stock market performance. Not surprising, both an increase in EPS and receiving an unqualified audit opinion are also favorable.

On the other hand, the accounts receivable and sales per employee signals are significantly and negatively related to one-year returns. This indicates that receivables growing faster (or falling slower) than sales and a decrease in sales per employee are favorable signals. These results are consistent with the alternative interpretations of the accounts receivable signal (Abarbanell and Bushee, 1997) and the sales per employee signal. In both cases, the alternative interpretation indicates that the signal provides information about expected future growth in sales, suggesting that investment in accounts receivable and addition of new employees are leading indicators of future sales growth.

Columns (2) and (3) of Table 3 report results of estimating model (1) separately for current sales increase and sales decrease subsamples of year *t*. For the firms that had an increase in sales, ΔEPS ($\beta = 0.674, p < 0.01$), capital expenditure ($\beta = 0.016, p < 0.01$), PP&E ($\beta = 0.133, p < 0.01$), inventory ($\beta = 0.014, p < 0.05$), gross margin ($\beta = 0.083, p < 0.01$), SG&A expenses ($\beta = 0.158, p < 0.01$), and audit opinion ($\beta = 0.029, p < 0.01$) signals are significant and positively related to one-year returns, and the accounts receivable ($\beta = -0.044, p < 0.01$) and sales per employee ($\beta = -0.121, p < 0.01$) signals are negatively related to one-year returns. The negative sign on accounts receivable and sales per employee signals suggests that, when sales increase, a larger increase receivables and in the number of employees is favorable for the company's future performance.

For firms that had a decrease in sales, the ΔEPS ($\beta = 0.378, p < 0.01$), PP&E ($\beta = 0.085, p < 0.01$), inventory ($\beta = 0.036, p < 0.05$) gross margin ($\beta = 0.065, p < 0.01$), and SG&A expenses ($\beta = 0.215, p < 0.01$) signals are positively related to one-year returns and the accounts receivable ($\beta = -0.071, p < 0.01$) and sales per employee ($\beta = -0.052, p < 0.05$) signals are negatively related to

the returns, which suggests that when sales decrease, a smaller decrease in receivables and management's unwillingness to let go of their employees ("labor hoarding") is favorable for the company's performance.

Table 5 provides estimation results of model (2) with an indicator for sales decrease (*D*). The results provide the same information as the separate regression results in Table 4, but the coefficients on the variables interacted with the sales decrease dummy indicate differences in the value change associated with signals between sales-increasing and sales-decreasing conditions in year *t*.

[Insert Table 5 Here]

We observe that the incremental coefficients on ΔEPS (β = -0.282, $p < 0.01$), capital expenditures (β = -0.008, $p < 0.10$), PP&E (β = -0.040, $p < 0.10$), gross margin (β = -0.033, $p < 0.05$), and audit opinion (β = -0.024, $p < 0.05$) signals interacted with the sales decrease indicator (*D*) are significantly negative. For the ΔEPS signal, this indicates that the value change associated with a change in EPS when sales decrease is less than the value change associated with a change in EPS when sales increase. There are a number of possible reasons for this. For instance, the earnings change when sales increase may be more persistent than the earnings change when sales decrease. Or the smaller coefficient may reflect higher downward elasticity of earnings when sales decrease due to cost fixity or cost stickiness.

For the capital expenditures, PP&E, and gross margin signals, the negative incremental coefficient indicates that the strength of the traditional interpretation versus the alternative interpretation is smaller when sales decrease. For CAPX, the traditional interpretation is that an increase in capital spending relative to industry peers is a good sign about future sales and the alternative interpretation is that an increase in spending relative to industry peers indicates

overinvestment. So the balance may swing more towards the alternative interpretation when sales are declining. In other words, the optimism about the company's CAPX may be reduced when sales are falling. For PP&E, the traditional interpretation is based on higher capacity utilization being a good sign whereas the alternative interpretation is that growing sales faster than PP&E may indicate that managers are less confident in future growth so they are investing less in new PP&E – the company may be moving from the growth stage to the mature stage of its life-cycle. Again, the balance may swing towards the alternative interpretation when there is a decline in sales. For gross margin, the smaller coefficient when sales are falling indicates that investors do not value a drop in margin when sales decline as much as they value an increase in margin when sales increase. If companies are discounting to retain customers when sales decline, this may be viewed favorably.

Surprisingly, the incremental coefficient is significantly negative for the accounts receivable (β = -0.046, $p < 0.01$) signal. Given that the coefficient is negative when sales increase, this means that the alternative interpretation is given more weight when sales decline than when sales increase. This suggests that extending additional credit to retain old customers or obtain new ones when sales are declining is an even stronger indicator of manager's confidence than when sales increase. This runs opposite to the earnings management prediction that managers may use credit unwisely to prop up earnings when sales are declining. The incremental coefficient on the sales per employee signal is significantly positive (β = 0.062, $p < 0.05$), indicating that the relative strength of the alternative interpretation is smaller when sales decrease – the market does not value the addition of new employees or retention of employees as strongly or puts relatively greater weight on the information conveyed by the signal about efficiency (traditional interpretation) when sales decline.

Overall, the results support H1, that fundamental signals, specifically ΔEPS, capital expenditures relative to industry, accounts receivable turnover, sales per employee, PP&E turnover and audit opinion, are differentially informative for firms with an increase versus a decrease in sales. With regard to audit opinion, one might expect that a clean opinion should be more valuable when sales are declining. Perhaps the market is more concerned about the integrity of financial reporting when sales are increasing.

We replace one-year returns (*RET1*) with two-year returns (*RET2*) as the dependent variable in the analysis of model (1) and (2), and the results are reported in Table 6 and 7.[5]

[Insert Table 6 Here]

[Insert Table 7 Here]

Some of the signals lose power when we go from one-year to two-year returns but overall the signals remain strong. The CAPX signal is weaker and the accounts receivable signal is not significant when sales increase. The incremental results for the accounts receivable and sales per employee signals remain strong (see table 7). The incremental coefficient for the SG&A signal is significantly positive for the 2-year return (it was not significant for the one year return).

VI. CONCLUSION

Our study contributes in two main ways to the fundamental analysis literature. First, it provides a more comprehensive discussion and description of the roles of individual signals than is found in the previous literature. In this regard, it considers both traditional and alternative intepretations for individual signals. We find that the alternative interpretations are stronger for the accounts receivable and employees to sales signals whereas the traditional interpretations are

[5] We also conduct year-by-year regressions of model (1) and (2) using Fama-MacBeth (1973) two-step procedure, the results are similar to those using a panel regression approach.

supported for the other signals. Second, it examines and illustrates how conditioning fundamental analysis on the direction of sales change may be useful. The description of traditional and alternative interpretations is useful for this part because it helps to explain why there are different value weights (coefficients) placed on some signals when sales decline versus when sales increase.

Our study also has implications for investors. Investors may be able to better utilize the information provided by fundamental signals and develop a more thorough understanding of the firm's financial position if they partition the signals according to the direction of the sales change.

Appendix I Definition and measurement of variables[a]

Variables (Signals)	Measured as
One-Year Size-Adjusted Returns ($RET1_{i,t}$)	Size-adjusted buy-and-hold returns for the 12-month period starting from the beginning of the fourth month of year *t* through the third month of year *t* + 1
Two-Year Size-Adjusted Returns ($RET2_{i,t}$)	Size-adjusted buy-and-hold returns for the 24-month period starting from the beginning of the fourth month of year *t* through the third month of year *t* + 2
Earnings per Share (ΔEPS)	$\frac{\text{EPS ("epspx")}_{i,t} - \text{EPS}_{i,t-1}}{\text{Stock price (prcc\_f)}_{i,t-1}}$
Capital Expenditure (*CAPX*)	ΔFirm CAPX ("capx") $-$ ΔIndustry CAPX[b]
Accounts Receivable (*AR*)	ΔSales ("sale") $-$ ΔAccounts receivable ("rect")
Sales per Employee (*SPE*)	$\left(\frac{\text{Sales}_{i,t}}{\#\text{Employees("emp")}_{i,t}} - \frac{\text{Sales}_{i,t-1}}{\#\text{Employees}_{i,t-1}}\right) \Big/ \frac{\text{Sales}_{i,t-1}}{\#\text{Employees}_{i,t-1}}$
Property, Plant and Equipment (*PP&E*)	ΔSales $-$ ΔPP&E ("ppent")
Inventory (*INV*)	ΔSales $-$ ΔInventory ("invt")
Gross Margin (*GM*)	ΔGross margin ("sale" $-$ "cogs") $-$ ΔSales
SG&A Expenses (*SG&A*)	ΔSales $-$ ΔSG&A expenses ("xsga")
Audit Opinion (*AO*)	1 for Unqualified, 0 for Qualified or other ("auop")

[a] Adapted from Lev and Thiagarajan (1993) and Abarbanell and Bushee (1997, 1998).
[b] Industry capital expenditure is measured by aggregating this item for all firms at the two-digit SIC code level.
Δ refers to percentage annual change in the variable from the prior year. The signals are defined such that their *expected* relation with stock returns is *positive*.

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Table 1 Descriptive statistics

Panel A: Full sample (N = 60,693)

Variables	Mean	P10	P25	P50	P75	P90	S.D.
EPS	0.933	-0.790	0.010	0.660	1.590	2.830	24.257
Sales	2,674.455	26.830	80.894	313.231	1,328.552	4,886.800	12,352.140
Inventory	271.072	1.998	7.640	32.056	146.800	530.342	1,128.775
Accounts Receivable	402.805	1.674	3.408	10.506	164.708	589.253	4,789.288
Capital Expenditures	161.458	0.659	2.641	12.841	63.453	261.781	859.016
PP&E	925.468	3.163	12.104	60.737	345.800	1,490.348	5,090.586
Gross Margin	874.130	9.315	27.873	104.233	427.094	1,548.591	3,913.503
SG&A Expenses	473.651	7.477	19.401	62.986	235.861	839.400	2,133.615
# of Employees	10.166	0.142	0.419	1.575	6.300	21.300	43.343
Total Assets	2,850.126	26.307	75.891	291.413	1,297.442	4,892.116	15,179.46
One-Year Returns	-0.002	-0.474	-0.288	-0.083	0.155	0.521	0.480
Two-Year Returns	0.008	-0.611	-0.407	-0.150	0.188	0.752	0.694
Signals							
ΔEPS	0.021	-0.094	-0.025	0.005	0.032	0.124	0.210
Capital Expenditures	0.299	-0.562	-0.279	0.026	0.442	1.207	1.248
Accounts Receivable	-0.032	-0.358	-0.128	0.005	0.130	0.308	0.457
Sales per Employee	0.077	-0.157	-0.041	0.042	0.135	0.298	0.292
PP&E	0.057	-0.250	-0.095	0.019	0.140	0.339	0.359
Inventory	-0.007	-0.353	-0.126	0.013	0.149	0.352	0.441
Gross Margin	-0.004	-0.151	-0.053	0.001	0.053	0.160	0.413
SG&A Expenses	0.251	-0.185	-0.068	0.002	0.074	0.209	0.251
Audit Opinion	0.728	0.000	0.000	1.000	1.000	1.000	0.445

Table 1 Descriptive statistics (continued)

Panel B: Sales increase (N = 44,153)

Variables	Mean	P10	P25	P50	P75	P90	S.D.
EPS	1.293	-0.370	0.180	0.860	1.770	3.010	26.641
Sales	2,750.058	30.296	89.657	340.759	1,395.891	5,001.435	12,633.990
Inventory	277.117	2.118	8.071	33.837	154.090	540.000	1,172.241
Accounts Receivable	385.892	3.723	11.400	42.720	172.132	593.000	4,234.970
Capital Expenditures	160.439	0.795	3.118	14.443	67.500	268.687	789.459
PP&E	891.269	3.430	12.970	63.705	349.605	1,461.492	4,598.322
Gross Margin	908.639	11.204	31.913	116.805	459.972	1,618.467	3,992.317
SG&A Expenses	489.109	7.893	20.549	66.489	248.000	871.983	2,195.590
# of Employees	10.722	0.157	0.461	1.716	6.650	22.101	46.799
Total Assets	2,772.804	28.337	81.795	306.781	1,318.377	4,829.750	13,925.890
One-Year Returns	0.028	-0.442	-0.258	-0.055	0.186	0.556	0.481
Two-Year Returns	0.021	-0.598	-0.391	-0.133	0.206	0.760	0.687
Signals							
ΔEPS	0.027	-0.049	-0.011	0.008	0.034	0.109	0.165
Capital Expenditures	0.397	-0.498	-0.212	0.093	0.540	1.376	1.310
Accounts Receivable	-0.017	-0.352	-0.118	0.014	0.145	0.350	0.484
Sales per Employee	0.121	-0.084	0.000	0.068	0.165	0.346	0.296
PP&E	0.097	-0.193	-0.053	0.049	0.173	0.387	0.359
Inventory	0.021	-0.333	-0.100	0.033	0.178	0.401	0.469
Gross Margin	0.004	-0.137	-0.045	0.004	0.054	0.165	0.427
SG&A Expenses	0.058	-0.117	-0.035	0.021	0.103	0.259	0.260
Audit Opinion	0.739	0.000	0.000	1.000	1.000	1.000	0.439

Table 1 Descriptive statistics (continued)

Panel C: Sales decrease (N = 16,540)

Variables	Mean	P10	P25	P50	P75	P90	S.D.
EPS	-0.025	-1.770	-0.540	0.110	0.930	2.160	16.223
Sales	2,472.633	20.479	60.828	248.435	1,154.036	4,612.5	11,564.100
Inventory	254.935	1.733	6.659	27.461	129.067	495.111	1,003.422
Accounts Receivable	447.955	2.751	8.347	33.112	147.802	577.353	6,024.107
Capital Expenditures	164.177	0.429	1.702	8.978	52.095	242.891	1,021.784
PP&E	1,016.761	2.579	9.963	52.330	333.132	1,586.443	6,215.843
Gross Margin	782.008	6.229	18.946	74.258	339.347	1,350.835	3,693.423
SG&A Expenses	432.388	6.614	16.674	53.874	205.315	738.415	1,958.057
# of Employees	8.682	0.113	0.323	1.259	5.300	18.800	32.318
Total Assets	3,056.534	22.559	62.365	251.093	1,226.748	5,064.500	18,104.490
One-Year Returns	-0.082	-0.539	-0.362	-0.156	0.064	0.398	0.468
Two-Year Returns	-0.027	-0.640	-0.447	-0.196	0.133	0.722	0.712
Signals							
ΔEPS	0.003	-0.216	-0.081	-0.019	0.022	0.192	0.296
Capital Expenditures	0.038	-0.673	-0.422	-0.140	0.181	0.704	1.022
Accounts Receivable	-0.073	-0.366	-0.151	-0.019	0.092	0.218	0.371
Sales per Employee	-0.040	-0.278	-0.140	-0.042	0.036	0.139	0.244
PP&E	-0.052	-0.350	-0.189	-0.065	0.031	0.167	0.334
Inventory	-0.081	-0.390	-0.184	-0.039	0.075	0.216	0.343
Gross Margin	-0.024	-0.182	-0.075	-0.008	0.051	0.150	0.372
SG&A Expenses	-0.095	-0.305	-0.160	-0.061	0.004	0.070	0.182
Audit Opinion	0.698	0.000	0.000	1.000	1.000	1.000	0.459

Table 1 Descriptive statistics (continued)
Panel D: Univariate descriptive statistics conditional on the direction of sales change

	Mean		
Variables	**Sales Increase**	**Sales Decrease**	**Test for Difference**
EPS	1.293	-0.025	5.964***
Sales	2,750.058	2,472.633	2.464**
Inventory	277.117	254.935	2.156**
Accounts Receivable	385.892	447.955	-1.421
Capital Expenditures	160.439	164.177	-0.477
PP&E	891.269	1,016.761	-2.704***
Gross Margin	908.639	782.008	3.550***
SG&A Expenses	489.109	432.388	2.916***
# of Employees	10.722	8.682	5.165***
Total Assets	2,772.804	3,056.534	-2.050**
One-Year Returns	0.028	-0.082	25.212***
Two-Year Returns	0.021	-0.027	7.621***
Signals			
ΔEPS	0.027	0.003	12.659***
Capital Expenditures	0.397	0.038	31.791***
Accounts Receivable	-0.017	-0.073	13.471***
Sales per Employee	0.121	-0.040	62.354***
PP&E	0.097	-0.052	46.505***
Inventory	0.021	-0.081	25.772***
Gross Margin	0.004	-0.024	7.323***
SG&A Expenses	0.058	-0.095	69.751***
Audit Opinion	0.739	0.698	10.024***

***, **, * denote *p*-value at or below 0.01, 0.05, and 0.10, based on a *t*-test for mean.

Panel E: Distribution of the direction of sales change

	Frequency	**Percentage**
Sales Increase	44,153	72.75%
Sales Decrease	16,540	27.25%
Total	60,693	100.00%

Table 2 Pearson Correlation Matrix

Variables (Signals)	*One-Year Returns*	*Two-Year Returns*	*ΔEPS*	*CAPX*	*AR*	*SPE*	*PP&E*	*INV*	*GM*	*SG&A*	*AO*
One-Year Returns	1										
Two-Year Returns	0.676	1									
	(0.000)										
ΔEPS	0.259	0.197	1								
	(0.000)	(0.000)									
CAPX	0.051	0.020	0.005	1							
	(0.000)	(0.000)	(0.179)								
AR	-0.023	-0.008	0.007	-0.020	1						
	(0.001)	(0.052)	(0.103)	(0.000)							
SPE	0.050	0.024	0.090	0.054	0.248	1					
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)						
PP&E	0.104	0.081	0.124	-0.164	0.193	0.580	1				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)					
INV	0.050	0.037	0.057	-0.019	0.209	0.371	0.321	1			
	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)				
GM	0.086	0.065	0.113	-0.001	-0.038	-0.060	-0.074	0.003	1		
	(0.000)	(0.000)	(0.000)	(0.790)	(0.000)	(0.000)	(0.000)	(0.401)			
SG&A	0.141	0.087	0.206	0.062	0.122	0.520	0.485	0.253	-0.108	1	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
AO	0.043	0.044	-0.005	0.045	-0.003	-0.005	-0.015	-0.001	0.014	0.006	1
	(0.000)	(0.000)	(0.227)	(0.000)	(0.190)	(0.190)	(0.000)	(0.866)	(0.000)	(0.138)	

Numbers in parentheses are *p*-values.

Table 3 Coefficient estimates of year-by-year regressions

Year	EPS	CAPX	Accounts Receivable	Sales per Employee	PP&E	Inventory	Gross Margin	SG&A	Audit Opinion	Intercept	*N*
1986	0.371***	0.022***	-0.005	-0.168***	0.125***	-0.020	0.052**	0.261***	0.142***	-0.163***	1,656
1987	0.406***	0.051***	-0.069***	-0.054	0.055*	0.013	0.008***	0.153***	0.149***	-0.174***	1,706
1988	0.305***	0.030***	0.003	-0.050	0.015	0.031	0.098***	0.215***	0.068***	-0.067***	1,753
1989	0.653***	0.046***	-0.057**	-0.056	0.083**	0.081***	0.071***	0.286***	0.069***	-0.069***	1,724
1990	0.619***	0.034***	-0.029	-0.009	0.120***	0.014	0.041	0.196***	0.103***	-0.107***	1,740
1991	0.383***	0.055***	-0.083***	-0.283***	0.203***	0.011	0.178***	0.430***	0.023	-0.061**	1,785
1992	0.690***	0.024***	-0.066**	-0.263***	0.246***	0.017	0.074***	0.227***	0.046**	-0.105***	1,896
1993	0.560***	0.030***	-0.002	-0.095**	0.118***	0.008	0.107***	0.137***	0.051***	-0.061***	2,056
1994	0.597***	0.031***	-0.045**	-0.208***	0.176***	0.037	0.047*	0.321***	0.046**	-0.021	2,193
1995	0.682***	0.030***	-0.114***	-0.066	0.187***	-0.028	0.075**	0.190***	0.021	-0.056***	2,275
1996	0.730***	0.051***	-0.035*	-0.170***	0.181***	0.026	0.102***	0.158***	-0.001	-0.033	2,321
1997	0.616***	0.025***	0.017	-0.127***	0.092***	0.005	0.087***	0.144***	0.080**	-0.113***	2,389
1998	0.543***	0.017**	-0.005	-0.151***	0.162***	0.062**	0.051*	0.221***	0.078**	-0.145***	2,319
1999	0.659***	0.051***	-0.125***	-0.009	0.259***	-0.081**	0.047	0.273***	0.146***	-0.208***	2,146
2000	0.655***	-0.022**	-0.083***	-0.207***	0.107**	0.093***	0.023	0.049	0.150***	-0.088**	2,075
2001	0.469***	0.028***	-0.108***	-0.303***	0.297***	0.066**	0.140***	0.140***	0.083***	-0.013	2,057
2002	0.471***	0.028***	0.025	-0.007	-0.020	0.028	0.054**	0.158***	0.037**	-0.106***	2,100

2003	0.503***	0.034***	-0.026	-0.123**	0.213***	-0.064**	0.002	0.222***	0.036	-0.026	2,141
2004	0.560***	0.000	-0.001	0.017	-0.051*	0.016	0.160***	0.096**	-0.013	0.014	2,126
2005	0.625***	0.017**	-0.062***	-0.035	0.075**	0.014	0.082***	0.262***	0.071***	-0.060***	2.126
2006	0.427***	0.021***	-0.008	-0.109***	0.169***	0.024	0.139***	0.120***	0.076***	-0.032***	2,103
2007	0.533***	0.020**	-0.076***	0.063	0.039	0.017	0.110***	0.193***	0.079***	-0.028**	2,041
2008	0.430***	0.004	-0.048**	-0.117**	0.093**	0.038	0.072***	0.100*	0.078***	-0.093***	2,060
2009	0.582***	-0.042***	-0.073**	-0.093	0.051	0.026	0.052*	0.067	0.014	0.029	2,045
2010	0.328***	0.028***	-0.081***	0.000	0.047	0.015	0.075***	0.167***	0.071***	-0.058***	1,997
2011	0.467***	0.008	-0.010	-0.116***	0.026	-0.011	0.139***	0.115**	0.032	-0.048**	1,972
2012	0.409***	0.025***	-0.001	-0.085**	0.134***	0.006	0.185***	0.178***	0.081***	-0.083***	1,958
2013	0.375***	0019**	-0.048**	-0.003	0.160***	0.059**	0.151***	0.099*	0.014	0.028	1,948
2014	0.360***	0.018**	0.009	-0.112**	0.019	0.069***	0.107***	0.123***	0.054	-0.076**	1,986
2015	0.382***	0.022***	0.027	-0.057	0.085***	0.056***	0.058***	-0.034	0.071***	-0.113***	1,999
Across-Years Means[a]	0.513*** (0.022)	0.024*** (0.004)	-0.039*** (0.008)	-0.097*** (0.017)	0.116*** (0.015)	0.021*** (0.007)	0.086*** (0.009)	0.176*** (0.016)	0.065*** (0.008)	-0.071*** (0.010)	
# Positive	30	28	5	2	28	25	30	29	28	3	
# Negative	0	2	25	28	2	5	0	1	2	27	

[a] Results are from year-by-year regressions computed based on Fama-MacBeth (1973) two-step procedure. The coefficients and standard errors (in parentheses) are the average across years.

*, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

Table 4 Regression results

	One-Year Returns ($RET1_{i,t}$)		
Variables (Signals)	**(1) Full Sample**	**(2) Sales Increase**	**(3) Sales Decrease**
ΔEPS	0.515***	0.674***	0.378***
	(0.017)	(0.027)	(0.023)
CAPX	0.017***	0.016***	0.007
	(0.002)	(0.002)	(0.005)
Accounts Receivable	-0.044***	-0.034***	-0.071***
	(0.006)	(0.007)	(0.015)
Sales per Employee	-0.092***	-0.121***	-0.052**
	(0.012)	(0.015)	(0.024)
PP&E	0.121***	0.133***	0.085***
	(0.010)	(0.013)	(0.019)
Inventory	0.019***	0.014**	0.036**
	(0.006)	(0.007)	(0.018)
Gross Margin	0.082***	0.083***	0.065***
	(0.007)	(0.008)	(0.015)
SG&A	0.177***	0.158***	0.215***
	(0.013)	(0.016)	(0.031)
Audit Opinion	0.031***	0.029***	0.018
	(0.005)	(0.006)	(0.011)
Intercept	-0.055***	-0.032**	-0.073***
	(0.012)	(0.014)	(0.025)
N	60,693	44,153	16,540
R^2	0.096	0.090	0.119

Results are from panel regressions for the full sample (Column (1)), sales increase sample (Column (2)) and sales decrease sample (Column (3)). The coefficients and standard errors (in parentheses) are the average across years.

The testing period is from 1985 to 2014.

Both year and firm fixed effects are controlled.

Numbers in parentheses are robust standard errors clustered by firm.

*, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

Table 5 Regression results with sales change indicator

One-Year Returns ($RET1_{i,t}$)			
Variables (Signals)	**(1) Sales Increase**	**Variables (Signals)**	**(2) Sales Decrease Incremental**
ΔEPS	0.672***	ΔEPS*D	-0.282***
	(0.026)		(0.033)
CAPX	0.016***	CAPX*D	-0.008*
	(0.002)		(0.005)
Accounts Receivable	-0.035***	Accounts Receivable*D	-0.046***
	(0.006)		(0.016)
Sales per Employee	-0.124***	Sales per Employee*D	0.062**
	(0.014)		(0.026)
PP&E	0.126***	PP&E*D	-0.040*
	(0.012)		(0.021)
Inventory	0.016**	Inventory*D	0.013
	(0.007)		(0.017)
Gross Margin	0.083***	Gross Margin*D	-0.033**
	(0.008)		(0.016)
SG&A	0.147***	SG&A*D	0.012
	(0.016)		(0.031)
Audit Opinion	0.035***	Audit Opinion*D	-0.024**
	(0.006)		(0.010)
Intercept	-0.043***	Decrease Dummy (D)	-0.043***
	(0.012)		(0.008)
N			60,693
R^2			0.103

Results are from panel regressions for sales increase sample (Column (1)) and interactions of fundamental signals and sales decrease dummy (Column (2)).

The sales increase sample is the reference group, meaning that the coefficients on the interaction terms represent the differences in the coefficients between the sales-increasing and sales-decreasing periods.

The testing period is from 1985 to 2014.

Both year and firm fixed effects are controlled.

Numbers in parentheses are robust standard errors clustered by firm.

*, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

Table 6 Regression results

	Two-Year Returns ($RET2_{i,t}$)		
Variables (Signals)	**(1) Full Sample**	**(2) Sales Increase**	**(3) Sales Decrease**
ΔEPS	0.547***	0.718***	0.393***
	(0.022)	(0.034)	(0.029)
CAPX	0.001	0.007*	-0.006
	(0.003)	(0.003)	(0.007)
Accounts Receivable	-0.025***	-0.014	-0.063***
	(0.007)	(0.009)	(0.018)
Sales per Employee	-0.135***	-0.155***	-0.022
	(0.016)	(0.020)	(0.031)
PP&E	0.147***	0.173***	0.129***
	(0.013)	(0.017)	(0.026)
Inventory	0.028***	0.027***	0.015
	(0.008)	(0.009)	(0.027)
Gross Margin	0.078***	0.076***	0.103***
	(0.009)	(0.011)	(0.018)
SG&A	0.108***	0.096***	0.299***
	(0.017)	(0.021)	(0.044)
Audit Opinion	0.025***	0.020**	0.014
	(0.008)	(0.009)	(0.017)
Intercept	-0.040**	-0.020	0.000
	(0.018)	(0.021)	(0.039)
N	60,693	44,153	16,540
R^2	0.053	0.055	0.084

Results are from panel regressions for the full sample (Column (1)), sales increase sample (Column (2)) and sales decrease sample (Column (3)). The coefficients and standard errors (in parentheses) are the average across years.

The testing period is from 1985 to 2014.

Both year and firm fixed effects are controlled.

Numbers in parentheses are robust standard errors clustered by firm.

*, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

Table 7 Regression results with sales change indicator

Two-Year Returns ($RET2_{i,t}$)			
Variables (Signals)	**(1) Sales Increase**	**Variables (Signals)**	**(2) Sales Decrease Incremental**
ΔEPS	0.695***	ΔEPS*D	-0.273***
	(0.033)		(0.044)
CAPX	0.005	CAPX*D	-0.013*
	(0.003)		(0.007)
Accounts Receivable	-0.013	Accounts Receivable*D	-0.063***
	(0.008)		(0.018)
Sales per Employee	-0.162***	Sales per Employee*D	0.096***
	(0.019)		(0.035)
PP&E	0.158***	PP&E*D	-0.029
	(0.016)		(0.028)
Inventory	0.031***	Inventory*D	-0.013
	(0.009)		(0.025)
Gross Margin	0.074***	Gross Margin*D	0.005
	(0.011)		(0.019)
SG&A	0.087***	SG&A*D	0.103**
	(0.020)		(0.044)
Audit Opinion	0.024***	Audit Opinion*D	0.002
	(0.009)		(0.014)
Intercept	-0.043**	Decrease Dummy (D)	0.021*
	(0.019)		(0.012)
N			60,693
R^2			0.056

Results are from panel regressions for sales increase sample (Column (1)) and interactions of fundamental signals and sales decrease dummy (Column (2)).

The sales increase sample is the reference group, meaning that the coefficients on the interaction terms represent the differences in the coefficients between the sales-increasing and sales-decreasing periods.

The testing period is from 1985 to 2014.

Both year and firm fixed effects are controlled.

Numbers in parentheses are robust standard errors clustered by firm.

*, **, *** indicate significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.